

REMARKS

In the present Amendment, the Description of the Related Art has been amended to provide the citations to the present inventor Mr. Huang's U.S. Patent Application No. 10/255,669 and U.S. Patent No. 6,872,236 at page 2, line 2 of the specification, relative to processes for producing high-purity hollow carbon nanocapsules as well as magnetic metal-filled carbon nanocapsules. As recognized by the Examiner, Mr. Huang's Application No. 10/255,669 and Patent No. 6,872,236 were meant to be referenced. See page 3 of the Action.

Independent claims 1, 10, 15 and 20 have been amended to recite that the hollow carbon nanocapsules have a purity of at least more than 50%. Support for the amendment may be found, for example, in paragraph No. [0021] of US 2003/0159917 (Serial No. 10/255,669 referenced in the Description of the Related Art).

Entry of the amendments is respectfully requested.

Claims 1-2, 5-11, 14-16, 19-21 and 24 are pending.

At pages 3-4 of the Action, claims 1-2, 5-11, 14-16, 19-21 and 24 are rejected under 35 U.S.C §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C §103(a) as allegedly being obvious over Lieber (US 6,159,742).

Applicant submits that this rejection should be withdrawn because Lieber does not disclose or render obvious the organically-functionalized carbon nanocapsules of the present invention.

In this regard, Lieber fails to teach or suggest a high-purity hollow carbon nanocapsule.

Independent claims 1, 10, 15 and 20 recite “a hollow carbon nanocapsule having a purity of at least more than 50%, and at least one kind of organic functional groups bonded thereon...” It is therefore clear that a high-purity hollow carbon nanocapsule of at least more than 50% purity is required.

The Examiner asserts that the processes employed in Mr. Huang’s Patent and Patent Application incorporated into the present specification are the same arc-discharge process as used by the Lieber ‘742 reference. Therefore, the Examiner reasons, it is expected that the same product would be formed.

Applicant respectfully disagrees. Lieber teaches that nanotubes can be prepared by arc discharge, as described by Colbert et al., *Science*, 266, 1218, (1994) (see column 5, lines 5-7). However, according to US 2003/0159917, the formation of carbon nanocapsules requires the application of pulse current (see Abstract). In absence of pulse current, as disclosed in Lieber, carbon nanotubes are formed instead of carbon nanocapsules. Even if a trace amount of carbon nanocapsules may be formed along with Lieber’s nanotubes, the amount is too trivial to purify due to the strong Van der Waals force between carbon nanocapsules and carbon nanotubes (see [0005] of US 2003/0159917). Clearly, Lieber fails to disclose a high-purity hollow carbon nanocapsule.

Applicant further notes that it is improper to compare the claimed nanocapsule to Lieber’s nanotube. The diameter of a carbon nanocapsule is 3-100 nm (see page 3, line 2 of the present specification). However, Lieber teaches that the aspect ratio (length/diameter) of the carbon nanotubes is at least 5 (see column 2, lines 24-29 of Lieber). Clearly, the outward

appearance and dimensions of carbon nanocapsules and carbon nanotubes are distinct, such that they are applied in different fields, for example, low-aspect-ratio carbon nanocapsules are usually used as heat-conducted fluid or drug carriers. High-aspect-ratio carbon nanotubes are used for field emission displays (FEDs), reinforced fibers, conductive films, and atomic force microscope (AFM) probes.

Additionally, carbon nanocapsules can be functionalized by a redox reaction, cycloaddition reaction, or a radical addition reaction. In the redox reaction, the carbon nanocapsules are reacted with a strong oxidant to oxidize the surface carbon layer of the carbon nanocapsules and form a functional group on the carbon nanocapsules (see page 4, lines 3-11 of the present specification). Thus, functional groups are uniformly distributed over the carbon nanocapsule surface. In contrast, Lieber teaches that a linking group L (functional group) is bonded at an end of the carbon-based nanotube (see Lieber's Abstract). Clearly, the functionalized positions of carbon nanocapsules and carbon nanotubes are different.

Accordingly, Applicant respectfully submits that Lieber fails to disclose or render obvious the organically-functionalized carbon nanocapsules of the present invention as set forth in independent claims 1, 10, 15 and 20. It is therefore Applicant's belief that claims 1, 10, 15 and 20 are allowable over the cited reference. Insofar as claims 2, 5-9, 11, 14, 16, 19, 21, and 24 depend from claims 1, 10, 15 and 20, respectively, it is Applicant's belief that these claims are also allowable.

Amendment Under 37 C.F.R. § 1.114(c)
U.S. Appln. No.: 10/606,965

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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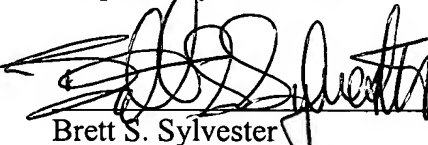
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